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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/706,861

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Yoshitaka Hamada

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1751

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/706,861

Applicant(s)

HAMADA ET AL.

Examiner

Kallambella Vijayakumar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-12 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-12 and 14-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

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DETAILED ACTION

- Claims 1 and 11 were amended. Claims 3 and 14 were cancelled.

Claims 1-2, 4-12 and 14-16 are currently pending with the application.

Response to Amendment

Applicant's amendment filed 07/11/2006 have been fully considered along with the arguments that overcome the following claim rejections cited in the last office action:

1. Claims 1, 6-7 and 9-10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 6-8 of copending Application No. 10/810,360.
2. Claims 1-4 and 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Burkett et al (J. Chem. Soc. Comm. 1996, pp 1367-1368).
3. Claims 1 and 5-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Yagihashi et al (US 2002/0132908).
4. Claims 1-2 and 6-16 are rejected under 35 U.S.C. 102(b) as anticipated by Egami et al (JP 2002-030249).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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1. Claims 1-2 and 4-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Brinker et al (US 6,387,453).

The use of phrase "for forming a porous film" in the claim-1 has not been treated with patentability. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Brinker et al teach forming a mesoporous, low dielectric constant, insulating thin film of silica on a substrate by coating a solution containing the components in a molar ratio of : TEOS (1) <Formula-1>: ethanol (22) : water (5) : surfactant (0.093-0.31) : hexadecyltrimethoxysilane (0.039-0.1) <Formula-2> (Abstract, C-5, Ln 59-65; Col-8 Ex-2). The surfactants included alkylammonium salts and sulfonates that meet the limitation of instant claims 2 and 5 (Col-3, Ln 53-Col-4, Ln 13, Col-4, Ln 18). With regard to the method claims 6-8, the prior art teaches coating a substrate and heating the films at about 250C to decompose the surfactant molecules (Col-4, Ln 34-37). With regard to claims 9-10, the prior art teaches porous dielectric films for thin film applications that are identical to that claimed by the applicants, and "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 11-12 and 13-16 are rejected under 35 U.S.C. 102(b) as anticipated by Egami et al (JP 2002-030249).

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The examiner notes the product by process limitation in the claims, and "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production.

Egami et al teach the semiconductor board containing a dielectric film of silica formed by coating a composition comprising: (A).1. **At least one silicon compound** selected from the group consisting of alkoxysilanes of the general formula (i) $ZnSi(OR)_4-n$; (A).2. Silane halides of the general formula (ii) $X_nSiX'_{4-n}$, wherein $X=H, F, 1-8C \text{ Alkyl}$; $R=H, 1-8C \text{ Alkyl}$; and $X'=halogen$; and (B). A quaternary ammonium organic template (Surfactant) (Abstract; Claim-5, Para 0070). The formula (1) encompasses tetraalkoxy silanes such as **tetraetoxysilane** and trialkoxysilanes such as **octyl trimethoxysilane** and octyl triethoxysilane that meets the limitation silanes of Formula-1 and Formula-2 in the instant claim 11 (Para 0015). The prior art further teaches coating a semiconductor board or a silicon substrate in a semiconductor device with in between wiring layers of multilevel connection and heat treating between 50-300°C and baking at 350-450°C (Para 0044, 0047-0051). Applicant's dielectric interlayer insulating layer of mesoporous silica silica film is formed by the calcination of a coating obtained from a cocktail of components, and the components by themselves are not an essential component of the porous dielectric film. The prior art device containing a dielectric silica film with a dielectric constant of ≤ 2.5 is identical to that claimed by the applicants in instant claims 11 and 16, and If the product in the product-by-process claim is the same as a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). With regard to product by process limitations containing specific components in claims 12 and 14-15, the examiner asserts that the art device will be identical to that obtained by the applicants process steps.

All the limitations of the instant claims are met.

The reference is anticipatory.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 11-12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yagihashi et al (US 2002/0132908) in view of Brinker et al (US 6,387,453).

Yagihashi et al teach a coating composition for forming an insulator layer over a semiconductor substrate that could be used as an interlayer of a semiconductor device comprising various tetrafunctional and trifunctional silanes containing C1-C12 hydrocarbon groups and a surfactant. The prior art teaches using admixtures of two or more silanes in the coating composition, and the silanes included tetramethoxysilane (Formula-1) and decyltrimethoxysilane (Formula-2) (Abstract, Para 0029-0032, 0042-

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0043). The prior art teaches using sulfonic acid catalysts in the composition (Para 0046) (See Specification, Page-15, Line-15). A porous dielectric film over the semiconductor substrate was made by spin coating the coating composition and heating the coated substrate between 300-500°C (Para 0059-0061).

The prior art fails to teach a semiconductor device containing an interlayer of porous film formed from a coating composition per the claim-11.

In the analogous art, Brinker et al teach making a porous dielectric silica film on a substrate by coating a silane composition that is similar to that by the applicant's and suggest of its use in devices including sensors (Semiconductor Device) (See Rejection-1 under 35 USC 102(b) and Abstract; Also, See Mihara, US 5,079,190, Col-1, Ln 14-16).

It would have been obvious to a person of ordinary skill in the art to combine the prior art teachings to substitute the dielectric film of Yagihashi with Brinker's film as functional equivalent with reasonable expectation of success, because the combined prior art teaching is suggestive of the composition.

2. Claims 11-12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egami et al (JP 2002/030249) in view of Brinker et al (US 6,387,453).

The disclosure on a semiconductor board containing a dielectric film of silica and its making by Egami et al as set forth in rejection-2 under 35 USC 102(b) is herein incorporated.

The prior art fails to teach a semiconductor device containing an interlayer of porous film formed from a coating composition per the claim-11.

In the analogous art, Brinker et al teach making a porous dielectric silica film on a substrate by coating a silane composition that is similar to that by the applicant's and suggest of its use in devices including sensors (Semiconductor Device) (See Rejection-1 under 35 USC 102(b) and Abstract; Also, See Mihara, US 5,079,190, Col-1, Ln 14-16).

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It would have been obvious to a person of ordinary skill in the art to combine the prior art teachings to substitute the dielectric film of Egami with Brinker's film as functional equivalent with reasonable expectation of success, because the combined prior art teaching is suggestive of the composition.

Response to Arguments

Applicant's arguments filed 07/11/2006 have been fully considered that overcame the rejections cited under Response to Amendments. However that the arguments that Brinker et al does not teach the claimed coating compositions and the component ratios is not persuasive, and this has been addressed in the rejections above (Response, Pg-6, Last Para). Further Applicant's arguments that Egami et al does not teach the claimed device has been fully considered (Response, Pg- 7, Para-1). The portions of the specification (Spec: Pg-13, Ln 6-12) cited by the applicant's recites that the component ratios beyond the claimed range "may" affect the properties of the films, and there is nothing on the record to show that the instant claimed film/device is patentably different than the prior art device/film.

For the reasons set forth above, the instant claims fail to patentably distinguish over the prior art composition/device.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KMV
September 24, 2006


DOUGLAS MCGINTY
SUPERVISORY PATENT EXAMINER

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